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ABSTRACT

The Omaha Westside Public Schools Director of Research made a thorough investigation of student participation in the commercially available mathematics programs, the Hoffman Mathematics System and Systems 80, and parental attitudes about student participation. This report answers questions dealing with the justification of Title I funds resulting in achievement for participating students, which of the two programs is most effective in this particular district and whether or not summer school attendance impacts achievement. In addition, cost of the program, teacher attitudes towards the program and ease of implementation are addressed. Short and long-term achievement effects are considered. The results of the study are discussed in three sections: student achievement, student attitude toward the instructional program, and a survey of Title I and Non-Title I parents. Results of the evaluation for the district's Title I Mathematics program for 1978-79 are also integrated whenever possible, making it possible to trace the achievement of some Title I students over all four testing periods during the last two years. (Author/CE)

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AN EVALUATION OF THE OMAHA WESTSIDE PUBLIC SCHOOLS TITLE I MATHEMATICS PROGRAMS

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AN EVALUATION OF THE OMAHA WESTSIDE PUBLIC SCHOOLS TITLE I MATHEMATICS PROGRAMS

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June, 1980

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EXECUTIVE SUMMARY

The 1979-80 Title I program in the Omaha Westside Public Schools was organized around two commercially available mathematics programs, the Hoffman Mathematics System and System80. The Hoffman Mathematics System was used with approximately 186 students in four schools, while System80 was used with approximately 116 students in three schools. The evaluation of the 1979-80 Title I program conducted by the ESU 18 Evaluation Team focused on:

1. A comparison of the progress of participants in the Westside Title I Math program with the progress of a similar group of nonparticipants during the 1979-80 year.
2. A comparison of the progress of participants in the Hoffman programs with participants in the System80 programs over the two year period of 1978-80.
3. A comparison of the progress of Title I students who did and did not attend summer school.
4. A comparison of the attitudes of students in the Hoffman, System80, and comparison programs towards different instructional areas over the two year period of 1978-80.
5. A description of the attitudes of parents of students in the two Title I math programs and of parents of students not participating in Title I.

Major results of the evaluation are summarized below:

1. Title I Achievement - Participants in both the math programs of the Omaha Westside Title I Project made significantly greater progress in math as measured by the SRA Achievement

Test than did nonparticipants from Westside who had equivalent Fall 1979 scores. Gains for both Title I groups were approximately 14 NCE units while the gain for the Westside comparison group was only about 2 NCEs. The significant difference found between achievement of students from two Title I programs combined and the comparison students replicates the finding of 1978-79 evaluation.

2. Achievement by Program - The evaluation of the Westside Title I programs during 1978-79 indicated there were no significant differences in achievement of participants in the Hoffman and System80 programs during that year. The present evaluation investigated the achievement of students who had participated in either program during the entire two year span from Fall 1978 to Spring 1980. Significant differences were found across the four testing periods when all students from both programs were combined. Significant differences were also found between the achievement over two years of students in the Hoffman versus System80 programs ($p < .05$) although this difference was small.

3. The Effects of Summer School Attendance on Achievement - Comparisons between the achievement of Title I students who attended summer school and those who did not yielded insignificant results. Achievement across both one and two year intervals was not found to be related to summer school attendance by Title I students.

4. Student Attitudes - The average attitude of primary students towards six instructional areas was significantly different

for Hoffman, System80 and comparison students. Primary students from the System80 programs had the most positive average attitude while the average attitudes of the Hoffman and comparison students were the same. This is in conflict with the finding of the evaluation for 1978-79 which indicated that primary level Hoffman students had higher overall attitude scores than did System80 students. The attitudes of intermediate students were also compared across the three groups and across the two annual evaluations. Students from all programs were similar in their dislike for social studies and spelling and in their preference for reading and science. Intermediate students from both the Hoffman and System80 programs had very positive attitudes towards Title I math across both years.

5. Parent Attitudes - Parents of children in both Title I programs and in Non-Title I programs were very positive about their child's instructional program. The attitudes of parents with children in the two Title I programs did not significantly differ except in response to an item concerning the degree to which the parent was receiving adequate information about his/her child's progress in Title I math. Parents of children in the Hoffman programs had more positive attitudes on this item.

The results of this evaluation study generally replicate and support the findings of last year's evaluation. Both the Hoffman Mathematics System and System80 appear to result in a greater rate of progress in math than can be expected without special Title I assistance. However, it does not appear to be evidence that either program is superior in terms of program impact on student achievement, overall student attitudes across all grades, and overall parent attitudes.

AN EVALUATION OF THE OMAHA WESTSIDE PUBLIC SCHOOLS TITLE I MATHEMATICS PROGRAMS

INTRODUCTION

The Omaha Westside Public Schools Title I Program during 1979-80 was organized around two commercially available mathematics programs, the Hoffman Mathematics System and System80. Brief descriptions of the two programs are presented in Appendices A and B. The Omaha Westside Public School Director of Research and Director of Title I identified five questions that served as the focal points of both the 1978-79 and the current evaluation. These questions were:

1. Do students who participate in Title I mathematics programs make more progress in mathematics achievement than similar students who do not participate in a Title I mathematics program?
2. Are there differences between participants in Title I Programs using either the Hoffman Mathematics System or System80 in terms of student progress in mathematics as measured by the SRA Achievement Test?
3. Do Title I students who attend summer school have higher achievement gains (i.e. less "summer drop off") than students who do not attend summer school?
4. Is there an end of year difference between participants in two Title I mathematics programs using either the Hoffman Mathematics System or System80 in temms of student attitudes towards mathematics?
5. How do parents of Title I students feel about the Title I program and the participation of their child in Title I?

The first three questions are concerned with the achievement of Title I students as measured by the nationally normed achievement test, the SRA Achievement Test. The first question focuses on the impact of the Title I program and is a restatement of the basic question that led to the initial evaluation requirement in Title I. Does the expenditure of Title I funds result in gains in achievement for participating students? The second question focuses on a local concern. Which of the two programs is most effective in the Omaha Westside Public Schools? Does one of the programs result in systematically larger gains in achievement and if so which one? The next question attempts to address the issue "Does summer school attendance impact achievement?" Both short and long term achievement effects should be addressed.

Achievement, however, is only one factor that needs to be considered in a comparison of two competing programs. Other important factors are the cost of the program, the attitudes of the teachers toward the program, the attitudes of the students, attitudes of the parents, and the ease with which the program can be implemented. Cost of the program and teacher attitudes were excluded from the scope of the external evaluation. However, questions four and five focus on two additional factors, the attitudes of students and the attitudes of their parents. Question four involves investigating the attitudes of participants in each program towards their particular Title I program, towards math in general, and towards other instructional areas. Question five focuses on parental support which is an important component in Title I. Federal and state regulations mandate an active parent advisory committee. However, the degree to which Title I parents support their own children in school and in Title I is likely to have a more lasting impact on the success of the program than the parent advisory committee.

Implementation of the program is another important factor which should be considered in any evaluation of educational programs. Implementation of the Hoffman Mathematics System and System80 math programs was verified during the 1978-79 year by third party consultants that were neither members of the ESU 18 Evaluation Team nor on the staff of the Omaha Westside Public Schools. Implementation of the two programs is briefly discussed in the 1978-79 evaluation completed by the Lincoln ESU 18 last year. More complete analysis of implementation successes and problems is available from the Research Department of the Omaha Westside Public School.

EVALUATION DESIGN

The evaluation design consisted of three data gathering phases: the first phase examined changes in student knowledge as measured by achievement scores; the second phase examined student attitude toward the instructional program; and the third phase examined parents' attitude toward their child's instruction. The instrumentation and sample descriptions for each phase and the evaluation questions of concern are presented below.

Student Achievement

Two groups of students were used to examine changes in student math knowledge. The first group consisted of those students receiving Title I supplementary math aid. These students were further categorized by the type of Title I program in which they were enrolled, i.e. Hoffman (N=186) or System80 (N=116). The total number of Title I participants was 302. The last group of students was categorized as the comparison group (N=49). These students were also low achievers, but were not

receiving any supplemental math aid because they were not located in areas served by Title I.

The instruments used to measure math progress were the SRA Achievement Tests. The tests were administered to all district students including Title I children in October 1979 and were readministered to Title I and comparison children in April 1980. The instruments yielded the raw and percentile scores on math. Normal Curve Equivalent Scores(NCEs) were used for comparing achievement scores. The questions of concern on student achievement were:

1. Was there a significant difference between Title I and comparison students on math knowledge as measured during the Fall 1979 and Spring 1980?
2. Was there a significant difference between the Hoffman and System80 Programs on math knowledge as measured during the Fall 1978, Spring 1979, Fall 1979 and Spring 1980?
3. Was there significant differences in achievement between Title I students attending summer school and those who did not?

Student Attitude

Evaluation of student attitude toward the instructional programs made use of two instrument techniques; the first for primary grade, the second for intermediate grades. The instruments ascertain student attitude toward six major areas of instruction: reading, spelling, science, social studies, math, and Title I math. Responses to the instruments were used to describe instructional area preferences as well as to compare the preferences of students in the Hoffman and System80 programs. (See Appendices C and D).

Primary Attitude Scales. The primary attitude scale consisted of six item Likert scale. Each of the six instructional areas as listed above was followed by a three point, pictorial Likert response, i.e. a smiling, neutral or frowning face. For each area of instruction, students were asked to select the face that most nearly indicated their feelings about that area of learning. A total of 147 students in grades two through four completed the primary attitude form in the Spring of 1979 and 141 students completed the survey in the Spring of 1980.

Intermediate Attitude Scale. A paired comparison instrument was used to measure attitude for grades four through six. This instrument consisted of a listing of all possible pairs (15) that could be formed from the six instructional areas. Students were then asked to select the "most liked" member of each pair. This method yielded not only feelings about the Title I subject area, but also how students compared that area to all other instructional areas. A total of 318 intermediate students completed the survey during the Spring of 1979 while 151 students completed the survey during the Spring of 1980.

The evaluation questions under consideration were as follows:

1. What are the attitudes of Title I and Non-Title I students towards various instructional programs?
2. Are there significant differences between the attitudes of students in the Hoffman and System80 programs towards the instructional areas?

Survey of Parent Attitudes Toward Instruction

The third phase of the evaluation examined parent attitudes toward their child's instruction. The sample consisted of three groups of parents: those whose child was enrolled in the Hoffman Title I program,

those whose child was enrolled in a System80 Title I program, and a comparison group of parents whose children were not in a supplementary math program. The instrument used consisted of a series of statements about instruction followed by a Likert scale (1=strongly disagree to 5=strongly agree). Seven of the statements dealt with instructional progress in general and were given to all parents. An additional five statements dealt with the Title I programs and were given only to Title I parents (see Appendices E and F). The instrument was mailed to all parents of Title I students and to a sampling of Non-Title I parents. Return of the instrument was voluntary and anonymous. Surveys were returned for 146 of the Title I parents and 67 Non-Title I parents.

The questions of concern to the evaluation were:

1. What are the attitudes toward instructional progress of Title I parents and Non-Title I parents?
2. Are there significant differences in the attitudes of parents with children in the Hoffman versus the System80 programs?

RESULTS

The results will be discussed in three sections presenting information on student achievement, two sections presenting results on student attitude toward the instructional programs, and one section presenting results of a survey of Title I and Non-Title I parents. Results of the evaluation for the Westside Public Schools Title I Mathematics programs for the 1978-79 year are also integrated into this results section where ever possible. For example, it was possible to trace the achievement of some Title I students over all four testing periods during the last two years.

Student Achievement During the 1979-80 Academic Year

Growth in achievement from the Fall of 1979 to the Spring of 1980 was investigated for the Hoffman, System80, and comparison students. A three groups by two time periods repeated measures analysis was used to analyze the achievement data in normal equivalent curve (NCE) form.[1] A significant interaction between the three groups across the two testing periods was found ($F=14.64$, $df=2/348$, $p<.0001$). Inspection of the means presented in Table 1 and Figure 1 show that achievement for the three groups was fairly equal for the pretesting during the Fall of 1979 but was very different across the three groups for the Spring 1980 testing. Achievement of both the Hoffman and System80 student groups increased approximately 14 NCEs while the control students' achievement increased only about 2 NCEs.

TABLE 1

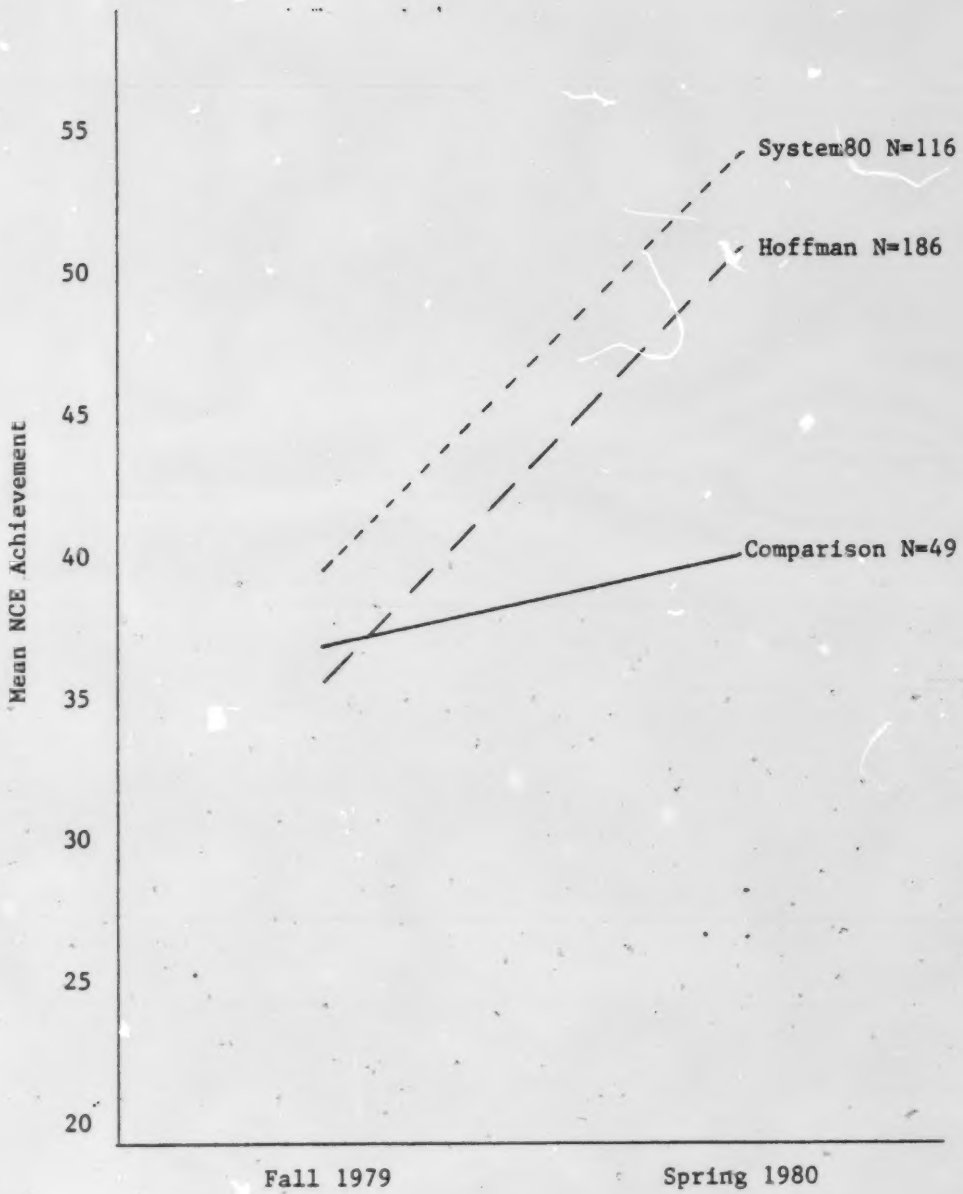
Mean NCE Achievement for the
1979-80 Academic Year

	Fall 79	Spring 80	NCE Gain
Hoffman	35.73	50.47	14.74
System80	38.61	53.21	14.60
Comparison	36.66	38.28	1.62

[1]NCEs are normalized standard scores with a mean of 50 and a standard deviation of 21.06. The NCE scale is an equal interval scale unlike the percentile scale and so they can legitimately be aggregated and averaged. (See Tallmadge, 1976 for further discussion of NCEs.)

FIGURE 1

Mean NCE Achievement for the
1979-80 Academic Year



Student Achievement During the 1978-79 and 1979-80 Academic Years

Achievement data for a total of 138 students was available across all four testing periods during which the two mathematics programs were being used. These students had participated in either the Hoffman or System80 programs for the entire two year period and so provide the most detailed information on achievement over time. Achievement data for the comparison students was not available across all four testing periods.

A repeated measures analysis for the two groups of students (i.e. Hoffman versus System80) across the four testing periods was performed on the percentile achievement data. Unlike the analysis of the Fall 1979 and Spring 1980 data only, a significant interaction was not found most likely because control students were not included in this analysis. However, significant main effects were found for both achievement across time ($F=39.46$, $df=3/134$, $p<.0001$) and between the two groups ($F=4.42$, $df=1/136$, $p<.05$), although the difference between the groups was relatively small.

Mean NCE achievement for students from the two programs across the four testing periods are presented in Table 2 and Figure 2. Increases in achievement were evident across all testing periods except for the one Spring to Fall testing where tests scores decreased. This decrease may be partially explained by the fact that most every student did not attend summer school between these two testings. It is also interesting to note that the patterns of achievement across time for the two groups of students were very similar. The similarity in achievement between the two groups across time provides evidence that one program was not obviously superior to the other when achievement was the variable of interest.

TABLE 2

Mean NCE Achievement for 1978-79 and
1979-80 Academic Years

	Fall 78	Spring 79	Fall 79	Spring 80
Hoffman	30.93	41.88	35.55	43.89
System80	35.03	42.06	37.81	49.08

Additional analyses were run to determine if the drop in achievement noted between the Spring 79 and Fall 79 testing was more prominent for those who did not attend summer school compared with those who did. Of the 138 students with achievement data across all four test periods, 68 had not attended summer school while 70 had. Repeated measures analyses across four testing periods (Fall 78, Spring 79, Fall 79, Spring 80) and across just the two testing periods during which summer school intervened (Spring 79 and Fall 79) were completed. No significant differences between students who did and did not attend summer school were found for either analysis (see Table 3). In other words, neither short term or long term differences in achievement were found dependent on summer school attendance. There are a number of possible explanations for these findings. For example, it could be argued that the students attending summer school were the poorest academically and that the fact they did not have significantly lower achievement scores is evidence of the success of summer school attendance. It also could be argued that summer school is not of a sufficient duration to impact achievement as measured by standardized tests. Any number of other explanations are also viable.

FIGURE 2

Mean NCE Achievement for 1978-79 and
1979-80 Academic Years

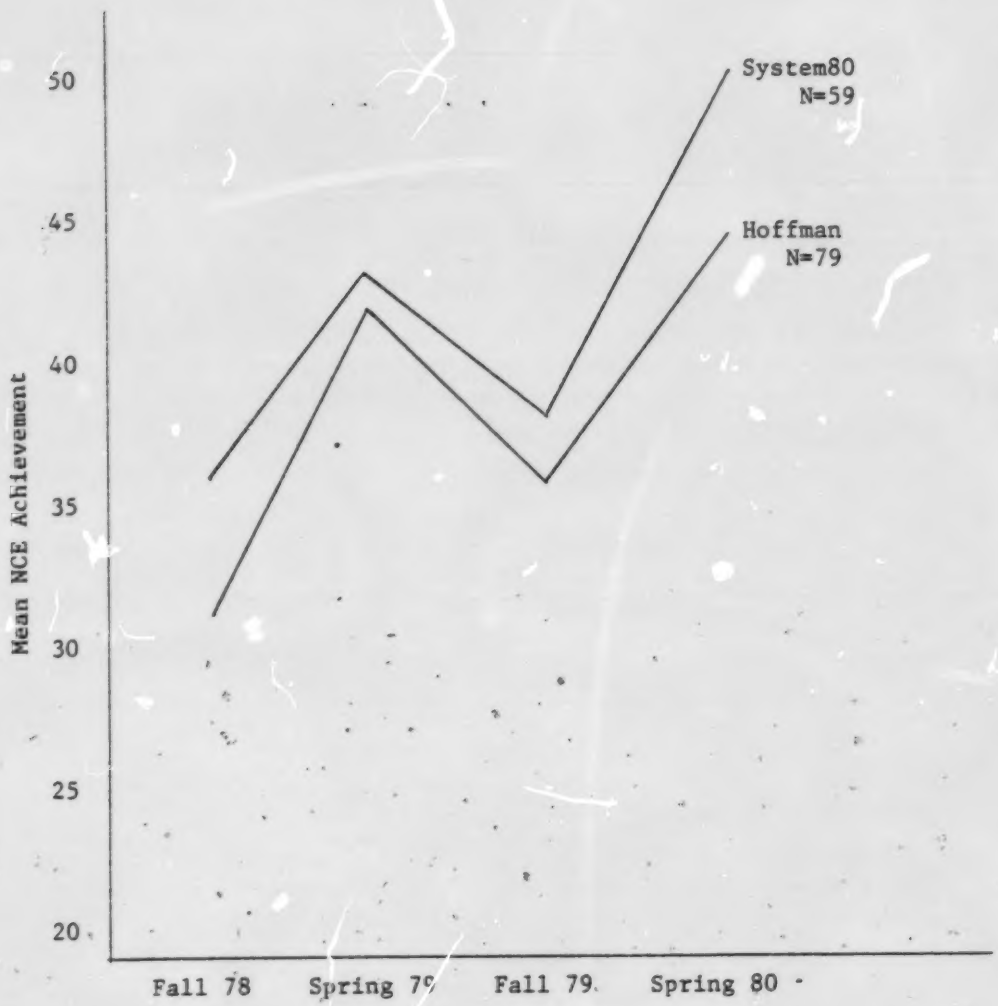


TABLE 3

Mean NCE Achievement for Students
who Did and Did Not
Attend Summer School

	Fall 1978	Spring 1979		Fall 1979	Spring 1980
Students who Attended Summer School (n=70)	32.73	42.71	Summer School	36.63	44.19
Students who did not Attend Summer School (n=68)	32.63	41.19		36.39	48.09

Attitude Toward Instruction: Primary Level

Students at the primary level were asked to indicate their opinion of math, spelling, social studies, science, and reading by marking one of three faces - a smile, neutral or frown. Students in the Hoffman and System80 programs also rated Title I Math while the control students did not. The primary attitude instrument is provided in Appendix C.

Average attitude ratings were computed by adding their responses to each subject area (1=smile, 2=neutral, 3=frown) and dividing by the number of ratings each student had. A one-way analysis of variance was used to investigate the relationship between students' average attitude and the program they were participating in (i.e. Hoffman, System80, Control). A significant difference was found between the three groups on their average attitude ($F=16.29$, $df=2/138$, $p<.0001$). While the average attitudes of students in the Hoffman program ($\bar{X}=1.78$, $sd=.35$, $N=49$)

and those of control students ($\bar{X}$=1.77, sd=.41, N=23) were almost identical, System80 students had an average attitude which was much more positive ($\bar{X}$=1.41, sd=.39, N=69). In other words, primary students in System80 programs indicated they liked the subject areas more on the average than did the Hoffman and control students.

Chi-square analyses were also used to test the relationship between which of the three programs the child was in and their rating of each subject area separately. Students in the three programs did not significantly differ in their ratings of Spelling and Reading, but did significantly differ in their attitudes towards Social Studies, Science, and Math ($ps < .05$). Students in the System80 programs were slightly more positive about science and were very much more positive about math.

Primary attitude means are presented in Table 4 for both the 1978-79 academic year and for the 1979-80 year discussed above to allow comparison across the two years by type of program. Students in the two mathematics programs for both years were similar in their positive attitude towards Title I Math and in their relative dislike of Spelling and Social Studies. In addition, students in both mathematics programs as a group were slightly more positive about Title I Math than were students as a group who were in the same programs last year.

Attitude Toward Instruction: Intermediate Level

Intermediate students' attitudes toward instructional areas were measured using the comparative judgment scale described in the evaluation design section and which was also used in last years' evaluation. Analysis of these results made use of the Law of Comparative Judgment as developed by Thurston. The first step of this analysis is to form a

TABLE 4

Primary Students Attitudes Towards Instructional Areas Across Two Years

1978-1979 Academic Year

	Hoffman N=57		System80 N=90	
	RANK	$\bar{X}$ (SD)	RANK	$\bar{X}$ (SD)
Math	2	1.47 (.6)	4	1.93 (.9)
Spelling	6	1.93 (.8)	6	2.03 (.8)
Social Studies	5	1.89 (.8)	5	2.01 (1.0)
Science	3	1.60 (.7)	3	1.61 (.8)
Reading	4	1.75 (.7)	2	1.54 (.7)
Title I Math	1	1.33 (.6)	1	1.42 (.7)

1979-1980 Academic Year

	Hoffman N=49		System80 N=69		Comparison N=23
	RANK	$\bar{X}$ (SD)	RANK	$\bar{X}$ (SD)	$\bar{X}$ (SD)
Math	3	1.76 (.8)	2	1.30 (.6)	1.74 (.8)
Spelling	5	2.06 (.8)	6	1.91 (.7)	1.83 (.8)
Social Studies	6	2.08 (.8)	5	1.83 (.8)	2.00 (.6)
Science	4	1.86 (.8)	3	1.49 (.7)	1.96 (.9)
Reading	2	1.65 (.8)	4	1.55 (.7)	1.35 (.6)
Title I Math	1	1.27 (.5)	1	1.15 (.4)	---- ----

*The scale used was: 1 = smile
2 = neutral
3 = frown

table of proportions showing the percent of times each instructional area was selected over each of the other instructional areas (see instrument used in Appendix D). There are a total of 15 pairs for the six different instructional areas. Table 5 presents summary information for the three groups regarding their preferences for the instructional areas. For example, 63% of the students in both the Hoffman and the System80 program indicated that they preferred Title I Math over regular Math.

Using the table of proportions showing the percent of times each instructional area was selected over the other areas makes it possible to derive an interval scale for ratings of each area. The interval scale indicates the degree to which each subject area was "liked" by the students relative to the other areas. This scale also provides comparative information as to how much each area was "liked" by students in the Hoffman program, System80 program, and in the comparison group. The interval scale values for the six instructional areas are presented in Table 6 by student group and for both the Spring of 1979 and the Spring of 1980. Inspection of Table 5 indicates that both Spelling and Social Studies were the most "disliked" subject areas for all groups of students and for both years of the evaluation. In addition, Title I Math was fairly high in terms of preference for the System80 students both years. However, for the Hoffman students, Title I Math was low in terms of preference for Spring 1979 but was extremely high in preference for the Spring 1980, making the overall preference similar to that of System80 students across years.

TABLE 5

Percentages of Students in Each Program Preferring
One Instructional Area Over Another

	Hoffman N=57	System80 N=75	Control N=19
Reading preferred over Spelling	77%	57%	58%
Reading preferred over Math	61%	39%	58%
Reading preferred over Social Studies	77%	52%	79%
Reading preferred over Science	54%	38%	74%
Spelling preferred over Math	42%	32%	32%
Spelling preferred over Social Studies	46%	52%	47%
Spelling preferred over Science	39%	39%	47%
Math preferred over Social Studies	56%	64%	63%
Math preferred over Science	47%	52%	47%
Social Studies preferred over Science	33%	27%	42%
Title I Math preferred over Reading	63%	63%	---
Title I Math preferred over Spelling	77%	72%	---
Title I Math preferred over Math	70%	56%	---
Title I Math preferred over Social Studies	72%	61%	---
Title I Math preferred over Science	54%	47%	---

TABLE 6

Interval Scale Values* for Instructional Areas By Program Type and Year

	Hoffman		System80		Control
	Spr. 1979	Spr. 1980 N=57	Spr. 1979	Spr. 1980 N=75	Spr. 1980 N=19
Reading	.57	.60	.43	.13	.68
Spelling	.08	.00	.00	.00	.15
Math	.16	.26	.43	.41	.49
Title I Math	.05	.72	.40	.45	---
Social Studies	.00	.04	.15	.02	.00
Science	.42	.44	.19	.45	.25

*low values indicate dislike while high values indicate a positive preference

Parent Survey Toward Title I and General Instruction

Parents of Title I children in both the Hoffman and the System80 programs were asked to respond to 12 statements regarding Title I and other instruction (see Appendix E). A total of 146 parents returned the survey of which 37 had children in Hoffman programs and 109 had children in System80 programs. Of the respondents, approximately 10% of the parents had children in either grade 2 or 6 and about 15% of the parents had children in grades 3, 4, or 5. A total of 33% of the parents said they did not know what grade their child was in or left this question blank. Over 50% of the parents indicated they only had one child in Title I. Most of the children had been in Title I either one year (32%), two years (25%), or three years (10%), according to their parents.

Average responses to each item by all the Title I parents combined are presented in Table 7. The average or mean was calculated based on responses where 1=Strongly Disagree through 5=Strongly Agree. T-tests were used to statistically compare the responses of parents of children in Hoffman programs to the responses of parents of children in System80 programs on each separate item. The only significant difference ($p < .05$) was found for parent responses to the item "I am receiving adequate information concerning my child's progress in Title I Math". Parents with children in the Hoffman programs agreed with this statement more than did parents with children in the System80 programs (respective means were 3.89 and 3.48; standard deviations were .88 and 1.12). Significant differerences between the two parent groups were not found for responses to any of the other item statements.

TABLE 7

Means and Standard Deviations for Responses on Parent Survey*

	Title I Parents N=146		Non-Title I Parents N=67	
	$\bar{X}$	(SD)	$\bar{X}$	(SD)
1. My child enjoys Title I Math more than the regular math class.	3.75	(1.13)	----	----
2. My child has a more positive attitude towards math this year than he/she had last year.	3.89	(.95)	3.92	(.81)
3. My child is wasting his/her time in Title I Math.	1.79	(1.00)	----	----
4. I feel that Title I Math is helping my child improve in math.	4.27	(.70)	----	----
5. I am receiving adequate information concerning my child's progress in Title I Math.	3.58	(1.07)	----	----
6. My child enjoys Title I Math.	4.08	(1.04)	----	----
7. My child enjoys his/her regular math class.	3.73	(.98)	3.94	(.88)
8. I am satisfied with my child's progress in math.	3.67	(.90)	4.06	(.75)
9. I am satisified with my child's progress in reading.	3.73	(1.01)	4.00	(1.03)
10. I am satisfied with my child's overall progress in school.	3.82	(.90)	4.19	(.72)
11. The teachers are interested in my child's progress.	4.34	(.61)	4.39	(.74)
12. The school is concerned with my child's progress.	4.39	(.62)	4.18	(.83)

*1=Strongly Disagree; 2=Agree; 3=Don't Know; 4=Agree; 5=Strongly Agree

SUMMARY AND CONCLUSION

Participants in both the Hoffman and System80 Title I programs made significantly greater progress in Math achievement during the 1979-80 school year than did a comparison group of similar students that did not participate in a supplemental Math program. However, the differences in achievement between participants in the two Title I programs were not statistically significant. Both these findings replicated findings reported in the 1978-79 evaluation. No significant differences in achievement were found for Title I students who did attend summer school and those who did not. Many explanations for this finding are possible.

Primary students in both the Hoffman and System80 had more positive attitudes towards Title I Math than any of the other five academic subject areas with which Title I was compared. These findings also replicate results reported in the 1978-79 evaluation. Students that participated in System80 had more positive attitudes towards regular Math than did students that participated in the Hoffman program.

Intermediate students from both the Hoffman and System80 program had very positive attitudes towards Title I Math. This finding represents a change from the earlier evaluation for students who participated in Hoffman but not for the students who participated in System80.

Parents of children in both Title I programs and in Non-Title I programs were very positive about their child's instructional program. The attitudes of parents with children in the two Title I programs did not significantly differ except in response to an item concerning the degree to which the parent was receiving adequate information about his/her child's progress in Title I Math. Parents of children in the Hoffman programs had more positive attitudes on this item.

Overall, both the Hoffman and System80 Title I Programs resulted in a greater rate of progress than would have been expected without special help. However, there was little evidence to suggest that one program was superior to the other.

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APPENDIX A

Hoffman Mathematics System

Hoffman Mathematics System

The Hoffman Mathematics System is a mathematics laboratory program published by Hoffman Educational Systems. Excerpts from the Hoffman Mathematics Catalog that describe the System are found on the following pages.

During the 1978-79 school year an independent consultant was hired to assess the degree to which the Hoffman Mathematics System was implemented within the Omaha Westside Public Schools. A copy of the implementation checklist used during the visitation follows the excerpts describing the program. Based on the results of the visitation, all schools were implementing the program according to criteria distributed by the publisher. Additional information about successes and problems in implementing the Hoffman Mathematics System is available from Dr. Enid Humphrey, Research Department of the Omaha Westside Public Schools.

The Hoffman Mathematics System

The Hoffman Mathematics System grows with children, broadening its range as their needs and skills change and mature. Certain features of the System are continued throughout all levels.

From the kindergarten, or readiness level, to sixth level, the Hoffman System is divided into audiovisual *Study Units*, which begin with a stimulating, artistically appealing motivational story. Each Study Unit has film slides, records and other materials for learning activities for its specific grade level, packaged in a jacket that resembles a record album.

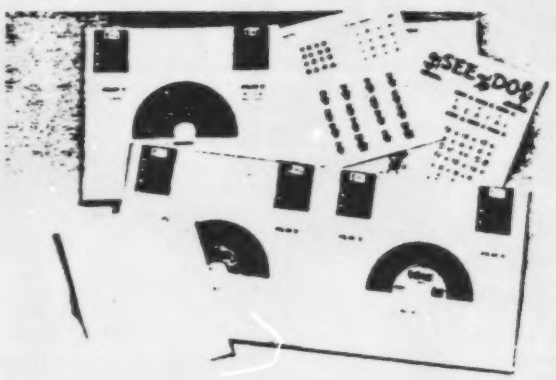
Ten Study Units are an *Achievement Unit*. Achievement Units are boxed in a durable, attractive vinyl case with Velcro fasteners.

A *Teacher's Manual* is available for each level of the Hoffman System. It documents the content of the particular program and offers suggestions for teacher-directed activities related to the audiovisual instruction.

The following sections contain detailed descriptions of the materials available at each level of the Hoffman Mathematics System.

Achievement Unit

Study Unit



Level and Lesson Designations

The Hoffman Mathematics System provides seven levels of instruction, within which are thirty-four sequential *Achievement Units*. Each Achievement Unit has a three-digit numerical designation. The initial number **3** indicates that an item is a component of the mathematics system. The second (middle) number indicates the level to which an Achievement Unit belongs. For example, 324 indicates that the Achievement Unit is in the second level of the Mathematics Program.

Levels K (Readiness) through Five consist of five Achievement Units each; Level Six contains four Achievement Units. The last digit of an Achievement Unit number indicates its place within the level:

Achievement Unit One = 321
Achievement Unit Two = 322
Achievement Unit Three = 323
Achievement Unit Four = 324
Achievement Unit Five = 325

There are ten *Study Units* (albums) in each Achievement Unit. A two-digit code following the Achievement Unit designation identifies the album number in sequence within the level. For example:

301 = K(Readiness) Level, Achievement Unit One.
Contains ten albums: 301-01 through 301-10

302 = K(Readiness) Level, Achievement Unit Two.
Contains ten albums: 302-11 through 302-20

303 = K(Readiness) Level, Achievement Unit Three.
Contains ten albums: 303-21 through 303-30

304 = K(Readiness) Level, Achievement Unit Four.
Contains ten albums: 304-31 through 304-40

305 = K(Readiness) Level, Achievement Unit Five.
Contains ten albums: 305-41 through 305-50

The albums in Levels One through Five are numbered in the same way. Level Six follows the same pattern, but as it contains only four Achievement Units (40 albums), album numbers range from 361-01 to 364-40.

To represent the sequential range of skills taught in the Hoffman Mathematics System, all programs and support materials in the seven levels are designated by the colors of the spectrum. Supplementing the numbering system, color-coding offers the educator a convenient tool for organizing and correlating all Hoffman mathematics materials.

Level K ..... Red
Level One ..... Orange
Level Two ..... Yellow
Level Three ..... Green
Level Four ..... Blue
Level Five ..... Indigo
Level Six ..... Violet

Levels—Kindergarten (Readiness), One, Two Mathematics Program

Each math lesson, called a *Study Unit*, is a complete learning package built upon designated instructional/mastery objectives.

In Levels K, One and Two, each Study Unit is introduced by an audiovisual motivational story that dramatizes or demonstrates the math instructional objectives of the lesson.

Step two of the instructional cycle is the audiovisual skill-building exercise called *Do and Discover*. Here the math objectives are pursued through further explanation and participation. The student is directed to respond to programmed skill development tasks and is able to evaluate his own performance on each task.

The audiovisual portion presents the correct answer to the task and the "why." Thus, the name *Do and Discover* aptly describes this activity. The "doer," the student, works with the Hoffman Viewer to "discover" the mathematical principles and perform the appropriate operations.

The objective of the audiovisual instruction and skill-building activities is to prepare the student to perform the required tasks independently. This is accomplished by the "off-viewer" activity called *See and Do* Booklet. The student interprets the visual direction on the left-hand margin and performs the tasks on each of the four pages.

The *Teacher's Manuals* consolidate all of the elements into a complete learning system. These Manuals are not only comprehensive resource books for the teacher, but guides as well.

The color-coded *Scope and Sequence Charts* for each level present the overall instructional design for each Study Unit on one side; the opposite side of each chart presents a listing of objectives by math strands.

APPENDIX B

System80

System80

System80 is an audio visual instructional program published by Borg Warner Incorporated. Instruction is organized around the following four dimensions:

diagnosis - the instructional needs of each student are systematically diagnosed.

prescription - a skill prescription is made on the basis of the diagnosis.

individualization - the student proceeds at his/her own rate through materials individually prescribed for his/her needs.

evaluation - upon completion of the prescription, evaluation is made of the student's progress.

Excerpt from the publishers description of System80 are found on the following pages.

During the 1978-79 school year independent consultants were hired to assess the degree to which System80 was being implemented within the Omaha Westside Public School. After visiting each System80 school the consultants concluded that -

> "two of the three Title I schools were not following the four criteria for implementation of a System80 program. None of the schools were utilizing System80 on a consistently routine basis every week. All three schools found need for the use of supplementary material. In two of the schools the teacher-outlined program overshadowed the System80 program. In these instances System80 was not the core of the program but only a supplement to the teacher-designed plan. The evaluators concluded that it was difficult to determine System80 program effectiveness when it was used only as a supplementary tool. It was most evident that the successful use of the System80 program is correlated to the attitude of the Title I teacher."[1]

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[1]Eloe, Marjie and Matthes, Carole. Westside Title I System80 Evaluation, undated.

Based on this assessment of implementation it is apparent that the System80 programs being evaluated are not pure System80 but rather is a hybrid program in which the Title I teacher is the most critical element. Additional information about successes and problems in implementing System80 is available from Dr. Enid Humphrey, Research Department of the Omaha Westside Public Schools.

Excerpts from
A Proposal for System 80
Borg-Warner Educational Systems
Arlington Heights, Illinois

DESCRIPTION OF SYSTEM80

System80 is a programmed audio-visual educational system designed to individualize instruction while supplementing a teacher's efforts in basic skill areas, where the foundation essential for success at higher levels is established – or lost. System80 is equally effective when used in the classroom or the learning center.

The System80 audio-visual unit resembles a small table television. Instructional materials include such basic subjects as alphabet, phonics, elementary reading, spelling, literacy, and mathematics presented in a simple step-by-step progression by showing colorful pictures, giving information, and asking questions.

System80 is designed to help teachers accomplish five vital educational tasks essential to a teacher's complete understanding and planning of each child's individual development.

1. Diagnose each student's knowledge of a subject.
2. Prescribe the lessons the student needs on an individual basis.
3. Teach the lessons prescribed.
4. Evaluate the student's progress.
5. Maintain a record of the student's progress.

Although all teachers want to accomplish these tasks, the average teacher often welcomes help in determining precisely where each pupil stands in each subject at any given time. The teacher also needs a way to supplement a child's basic instruction without disrupting the rest of the class. It is virtually impossible, without the type of assistance provided by System80, for even the best teacher with a reasonably small class to always know where each of the pupils stands in every subject. By the time the teacher discovers that a child has fallen behind, it is difficult to help the child catch up; by the time the teacher finds out that a fast learner is not fulfilling his or her potential, it may be just as difficult to give that child the kind of challenge needed to move ahead. The teacher also requires a way to diagnose the needs and prescribe an appropriate program for a child new to the class.

OPERATION OF SYSTEM80

Materials are not arbitrarily specified for use in a particular primary grade. Rather, a subject area is divided into kits according to sequential levels of difficulty. Therefore, a kit may be used by any student who needs work in that level. A typical kit contains nine lessons and a pre and post-test. Each lesson consists of a special phonograph record and a filmslide. The

record contains eighty statements or questions that correspond to the eighty color pictures, or "frames," on a filmslide.

Constructed of durable, flexible Cycolac, the filmslide is affected by neither heat nor cold and is virtually indestructable. The filmstrip itself is permanently sealed in the filmslide, laminated between protective panels of clear Lexan. The record and filmslide will remain in synchronization, a patented feature of System80.

Each kit contains a pre and post-test record and filmslide. All incorrect responses are recorded on a special strip of paper called a "Test Tab," which is attached to the test filmslide. By looking at the Test Tab, a teacher is able to diagnose which lessons in the kit the student needs to take, or whether he or she should immediately advance to the succeeding level. The teacher then prescribes the appropriate lessons. The post-test measures the student's progress upon completion of these prescribed lessons.

A pupil takes a lesson or test by inserting the record and filmslide into the unit and putting on a pair of earphones. When the earphones are plugged in, they automatically shut off the system's built-in loudspeaker so that only the person using the unit can hear the audio. This insures privacy for the child, helps him or her concentrate, and keeps the rest of the class from being disturbed.

As the picture (or "frame") appears on the screen and the lesson begins, the child sees letters, numbers, words, or drawings that represent possible responses to the statements and questions that he or she hears. The child makes a selection and pushes a response button. If the answer is correct, the lesson moves to the next frame, showing a new picture and asking a new question. If the answer is incorrect, the same picture remains on the screen and the audio patiently asks the same question again until the correct response is made.

The process continues through the lesson's first forty frames, at which point the child turns both the record and filmslide over and works on the remaining forty frames. When the child completes the lesson, he or she replaces it in the kit box then returns to his or her seat in the classroom and the next pupil takes a turn.

Note

Branching: A unique feature of System80 available only from Borg-Warner.

Review lessons utilize the branching capability of the System80 unit. If certain key questions are answered correctly, the unit will skip the next one or more frames that are related to the correctly answered key question. If the key question is answered incorrectly, supplementary remedial frames are presented. "Branching" keeps the fast learner from becoming bored with already mastered material, yet provides the slow learner with necessary additional information or remedial help.

HARDWARE

The hardware proposed is the System80 audio-visual unit. This audio-visual unit has many distinctive features that make it unusually effective in an individualized learning program.

1. The unit is very simple for the student, the teacher and/or aide to operate. The materials are simple and durable enough for even a five-year-old to handle.
2. The System80 programs are truly individualized. Appropriate lessons can be prescribed to meet each student's learning needs. Within individual lessons, the System80 unit has the ability to advance, repeat, or branch to a remedial frame depending upon the learner's response. Thus, the materials are individualized even within the individual lessons.
3. The System80 unit will administer and score the criterion-referenced pre and post-tests.
4. The System80 unit assures student involvement and response with immediate feedback.
5. The unit is of a pleasing and mature design and is designed for long periods of heavy usage.

SOFTWARE

Every lesson of System80 has been validated. Lessons are designed to teach high priority learner outcomes as indicated by extensive research. These highly motivating lessons will provide an opportunity for each pupil to achieve at his or her own rate of skill mastery. The software programs recommended include:

1. A wide range of levels of skills so that each student can enter the program at the appropriate instructional level.
2. Criterion-referenced diagnostic instruments for measurement of skill deficiencies.
3. A simple management system that enables the student to be placed into appropriate instructional material.
4. A simple system for immediately recording student's progress.
5. Progress checks for continuous evaluation.
6. Review lessons for maintenance of skills.
7. The materials are very simple for the student, teacher, and/or aide to operate.
8. Post-tests to measure student's progress.

APPENDIX C

Student Attitude Toward Instructional Programs - Primary Grades

TO BE USED IN GRADES 2-4

DIRECTIONS: For each word, place an X on the face that shows how you feel about that word.

For Example:

If you like Art

Ex. 1. Art

Ex. 2. Music If you do not like music

If P.E. does not matter.

Ex. 3. P.E.

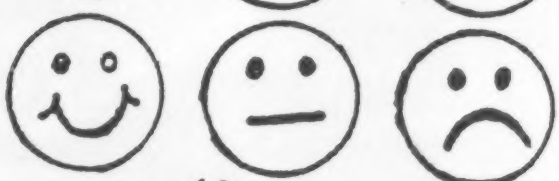
ROW 1 - MATH

ROW 2 - SPELLING

ROW 3 - SOCIAL STUDIES

ROW 4 - SCIENCE

ROW 5 - READING

ROW 6 - TITLE I MATH 

APPENDIX D

Student Attitude Toward Instructional Programs -
Intermediate Grades

DIRECTIONS: For each of the following word pairs, place a check beside the course you like the best. Do this for each pair.

For example: Ex.1 _____ Art Ex.2. _____ Music

_____ Music _____ P.E.

1. _____ Reading
   _____ Spelling

2. _____ Reading
   _____ Title I Math

3. _____ Title I Math
   _____ Social Studies

4. _____ Social Studies
   _____ Science

5. _____ Science
   _____ Spelling

6. _____ Social Studies
   _____ Reading

7. _____ Math
   _____ Spelling

8. _____ Title I Math
   _____ Spelling

9. _____ Math
   _____ Social Studies

10. _____ Math
    _____ Title I Math

11. _____ Science
    _____ Title I Math

12. _____ Math
    _____ Reading

13. _____ Social Studies
    _____ Spelling

14. _____ Math
    _____ Science

15. _____ Science
    _____ Reading

APPENDIX E

Title I Parent Survey

Dear Parent,

We have purchased many new materials this year to try to make the Title I program more effective. We are trying to determine which materials are helping children most. We would sincerely appreciate it if you would fill one of these out for each child in Title I. We need one for each child because the materials may be better at some grade levels than at others and we need to know this.

Please check the correct answer.

1. The grade level of my child.

Grade 2 _____	Grade 6 _____
Grade 3 _____	Grade 7 _____
Grade 4 _____	Grade 8 _____
Grade 5 _____	Grade 9 _____
	Don't Know _____

2. The number of years my child has been in Title I.

1 year _____
2 years _____
3 or more years _____
Don't Know _____

3. The number of my children enrolled in a Title I program.

1 child _____
2 children _____
3 or more children _____
Don't Know _____

Directions: Please circle the number that reflects the degree to which you agree with each statement. Use this scale:

1 - Strongly Disagree
2 - Disagree
3 - Don't Know
4 - Agree
5 - Strongly Agree

	SD	D	DK	A	SA
1. My child enjoys Title I Math more than the regular Math class.	1	2	3	4	5
2. My child has a more positive attitude towards math this year than he/she had last year.	1	2	3	4	5
3. My child is wasting his/her time in Title I Math.	1	2	3	4	5
4. I feel that Title I Math is helping my child improve in math.	1	2	3	4	5
5. I am receiving adequate information concerning my child's progress in Title I Math.	1	2	3	4	5
6. My child enjoys Title I Math.	1	2	3	4	5

		SD	D	DK	A	SA
7.	My child enjoys his/her regular math class.	1	2	3	4	5
8.	I am satisfied with my child's progress in math.	1	2	3	4	5
9.	I am satisfied with my child's progress in reading.	1	2	3	4	5
10.	I am satisfied with my child's overall progress in school.	1	2	3	4	5
11.	The teachers are interested in my child's progress.	1	2	3	4	5
12.	The school is concerned with my child's progress.	1	2	3	4	5

APPENDIX F

Non-Title I Parent Survey

Dear Parent:

We have a program called Title I Math in our district. We are trying to find out how effective it is. Your child does not have the program but we would like for you to help us out by answering a few questions. This will help us find out whether parents of children in Title I and parents of children not in Title I feel differently about their child's progress in school.

Directions: Please circle the number that reflects the degree to which you agree with each statement. Use this scale:

1 - Strongly Disagree
2 - Disagree
3 - Don't Know
4 - Agree
5 - Strongly Agree

	SD	D	DK	A	SA
1. My child has a more positive attitude towards math this year than he/she had last year.	1	2	3	4	5
2. My child enjoys his/her regular math class.	1	2	3	4	5
3. I am satisfied with my child's progress in math.	1	2	3	4	5
4. I am satisfied with my child's progress in reading.					
5. I am satisfied with my child's overall progress in school.	1	2	3	4	5
6. The teachers are interested in my child's progress.	1	2	3	4	5
7. The school is concerned with my child's progress.	1	2	3	4	5

MY CHILD IS IN GRADE _____